1996

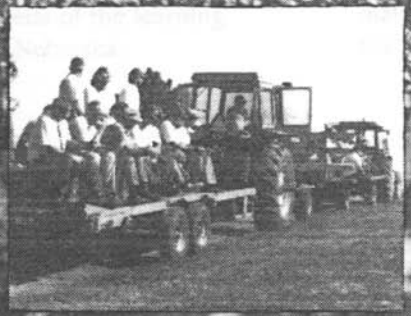
Northeast Research and Extension Center VIP Tour 1996

University of Nebraska

Institute of Agriculture and Natural Resources IANR

NORTHEAST RESEARCH & EXTENSION CENTER

VIP TOUR



W • E • L • C • O • M • E

to the Northeast Research & Extension Center

Robert D. Fritschen

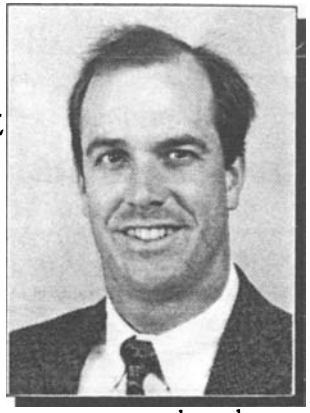
Director, Northeast Research & Extension District

The Annual VIP tour is one opportunity to share a part of our program emphasis with a targeted group. This year's VIPs are Cooperative Extension staff from South Dakota and Iowa, and members of the Board of Directors from the South Dakota State University Southeast Research Farm located near Bereford, SD. We extend a special welcome to these important partners in agriculture and natural resources. Through this experience, we hope that our role, process, and impact may be better understood, and that collectively, we are better able to meet the needs of the learning communities in northeast Nebraska.

A long standing theme is that research reduces risk. Part of our role is to conduct well-targeted research that addresses critical agricultural issues of the area, but another and equally important part of our mission is education extension. That includes getting research results into the hands of the user in a timely fashion.

Last year, staff in the 16-county Northeast District recorded over 151,000 contacts. This is equal to more than one contact by every person living in the 16-county area. We feel we are truly making an impact and significant contribution toward making Nebraska's good life better.

Integrated Weed Management



David Holshouser
Integrated Weeds Management Specialist
Assistant Professor, Agronomy

Integrated weed management research at the NEREC focuses on utilizing all available management techniques to minimize the negative effects of weeds on crops. Ongoing research includes reduced herbicide rate technology and the utilization of crop row spacing and plant population to improve weed control.

Another major thrust of the weed science project is returning CRP lands to crop production. One of the main concerns is managing and controlling the grass vegetation currently occupying the land. Although deep tillage is an option, such a vegetation control practice would lead to increased soil erosion and soil quality degradation on land which is environmentally sensitive and of relatively low productivity. Another option is chemical control combined with no-till or minimum-till planting. We are researching how residue management, tillage, and cropping system affect this control. Initial results indicate that no-till production systems are feasible if correct steps are taken to control the grass vegetation.

Integrated Pest Management

Keith Jarvi
Extension IPM Assistant

When returning CRP into field crops, one of the major concerns has been what type of soil insect problems could occur and how should those potential problems be managed. For the past several years, we have been screening soil insecticides and seed treatments for efficacy against wireworms, cutworms, and seed corn maggots. During the last two years of our CRP research, we have not had a threatening population of soil insects to deal with. We have opted to use an inexpensive seed treatment to protect our field crops during seedling establishment.

We have used a simple solar bait trap for determining whether or not a soil insecticide or seed treatment should be used. Use of the solar bait trap before planting to determine wireworm population levels could save farmers approximately 15 dollars an acre.

Crop Nutrition

The effect of manure application and reduced insecticide rates on corn rootworm feeding intensity

Charles Shapiro
Soil Scientist-Crop Nutrition
Associate Professor, Agronomy

Investigators: Charles A. Shapiro and John Witkowski
Research Management: Jerry Echtenkamp

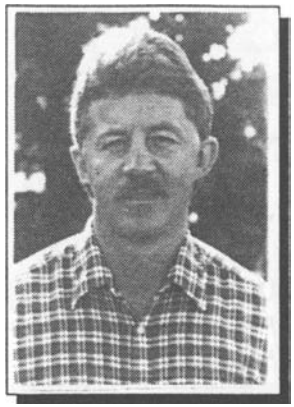
Under-utilization of animal manures is a challenge for Nebraska agriculture because of the large quantities of manures produced, and the concentrations of livestock in confined feeding units. Twenty-eight million tons of fresh manure are produced annually by the Nebraska cattle and swine industry.

Best Management Practices for the use of manure for its nutrient content are established, however, the cost of handling, storage, transportation and distribution are sometimes greater than the fertilizer savings. Any documented additional benefits to manure application at agronomic rates will increase the use of manure as a soil amendment.

Some research has indicated that manure application stimulates root growth in corn in a way that might decrease corn rootworm larvae feeding damage. Other research in Nebraska has indicated that reduced rates of insecticide are effective in reducing damage from corn rootworm larvae. The objective of this research is to determine the interaction effect of manure application, root strength rating, and reduced rates of soil insecticide on corn rootworm larvae survival, root damage, and corn yield.

This project is funded by the Crop Production Trust, administered by the University of Nebraska Department of Agronomy, and is a cooperative effort with Entomology.

Soil Water Management



Nitrogen use by non-effective alfalfa

William Kranz
Assistant Professor,
Biological Systems
Engineering

Livestock production facilities for swine often use open lagoons as temporary storage facilities for animal manure and water used to flush manure from the production building. In eastern Nebraska, the evaporation loss from the lagoon water surface is insufficient to evaporate the flush water plus the rainfall received each year. Thus, producers are forced to distribute the manure using spreaders or irrigation systems.

In many cases, the manure is distributed to land areas closest to the facilities to minimize hauling and distribution costs. Large production facilities have a much larger problem due to the shear volume of manure produced. Few of these facilities control enough land to distribute the manure in an environmentally safe manner to land areas planted to traditional crops.

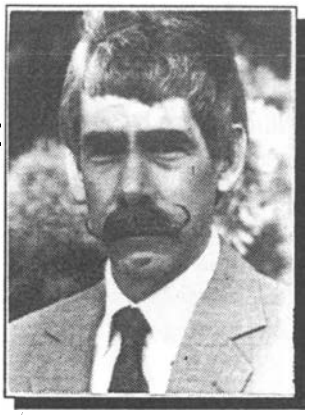
Our research team has evaluated alfalfa as a crop that has commercial value and an extended application season, and fixes a lot of nitrogen. The dry matter produced annually by irrigated alfalfa may contain between 800 and 850 pounds of nitrogen per acre. A new isoline of alfalfa was developed by the University of Minnesota that does not fix its own nitrogen, but maintains production capacity similar to the fixating type of alfalfa. The isoline relies on the nitrogen similar to how corn relies on it.

Funded by the Burlington Northern Foundation Endowment fund, the project seeks to establish the level of swine manure nitrogen that can be harvested by fixating and nonfixating alfalfas without negative impacts on water quality.

Crop Residue Management

Manure injection

David Shelton
Professor, Biological Systems Engineering



Leave crop residue on the soil surface for erosion control!

Incorporate manure into the soil to maximize nutrient availability and minimize odors and runoff potential!

Research to help resolve the conflict between these two Best Management Practices is currently in progress. Various configurations of manure injectors are being used in oat, corn, and soybean residues to evaluate how much of the initial residue cover is retained. With this information, livestock producers should be better able to select a manure management system that is also compatible with their soil erosion control objectives.

Financial support for this project is provided by the Nebraska Pork Producers Association, and equipment has been supplied by Balzer, Calumet, Sukup, and Vittetoe manufacturing companies.

CRP Research to Crops

Melinda McVey McCluskey
CRP Research Coordinator

CRP to crops research at the Center is now in its second cropping season. Research began on land owned by Charles Paulsen in the fall of 1994. The research is located on a quarter section of smooth brome adjacent to the NEREC.

A cropping systems experiment was designed to work with three residue management systems (no removal, shred, and mechanical removal), three tillage systems (plow, disk, and no-till), and four crop rotations (corn-corn-corn, corn-soybean-corn, soybean-corn-soybean, and sorghum-soybean-corn).

The purpose of this study is twofold. First, to determine a viable cropping system for the return of CRP to crop production, and second, to determine long term effects the first year practices have on subsequent crop rotations.

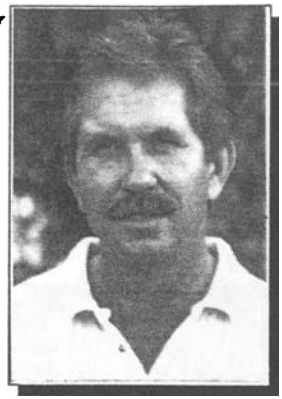
Four other studies take an in-depth look at factors that should be considered when returning CRP to crops. These include the following: corn fertility needs, vegetation management, insect damage in first year out corn, and potential rodent problems in CRP returned to crops.

Results from 1995 indicate that soybean is the crop of choice the first year out of CRP. Soybean yield was the same regardless of residue and tillage practices. When planting soybeans, no nitrogen fertilizer was required and there were fewer smooth brome escapes.

The cropping systems research will continue with the next track of CRP being returned to crops in 1997 and the rotation study continuing through 1999.

Entomology

Bt Transgenic Corn



John Witkowski
Professor, Entomology

John Witkowski and Tom Hunt, Graduate Research Assistant in Entomology, have been researching Bt transgenic corn varieties for the last few years.

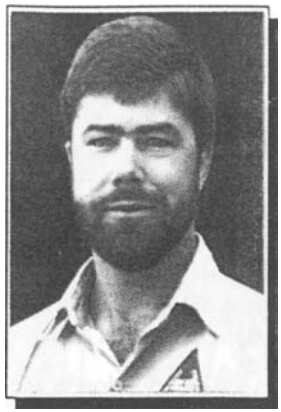
Seed corn that has been genetically engineered to express an insecticidal protein lethal to European corn borer larvae was first commercially available in 1996 and likely will be more extensively available in 1997. These hybrids are commonly referred to as Bt hybrids or Bt transgenic corn hybrids.

The insecticidal protein is a modified version of a protein present in *Bacillus thuringiensis*, a naturally occurring bacteria present in the soil. This same bacteria is commonly formulated on a granule or as a liquid insecticide against selected moth and butterfly larvae. Field efficacy evaluations of many of these Bt hybrids at the Northeast Center indicate effectiveness equal to or far greater than conventional insecticide applications.

One of the main concerns of this technology is possible resistance. An understanding of moth movement and dispersal is critical to the understanding of gene flow and eventual development of resistance management programs. A mark/release/recapture study of adult European corn borer was initiated this year to study moth movement from release sites in corn. Laboratory-reared moths were successfully marked with Sudan Blue 670 and Sudan M Red dyes and released at two sites at the University of Nebraska Agricultural Research and Development Center, near Ithaca, NE. Catches of insects from light traps located near release sites are currently being screened for marked corn borer adults.

Forestry in Nebraska

Nebraska Conservation Tree/Shrub Program



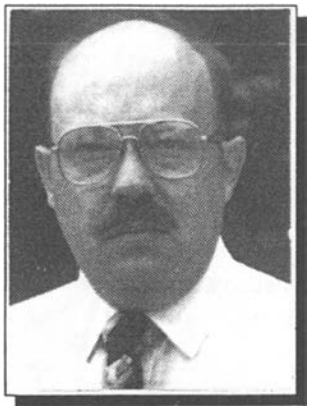
Steve Rasmussen
Associate Professor, Forestry, Fisheries, Wildlife

The Nebraska Forest Service provides tree and shrub species for conservation uses of many kinds. Field windbreaks, farmstead shelterbelts, wildlife habitat, woodlot plantings, and riparian filter strips are the common uses for the seedlings distributed. In 1996, there were over 40 different types of plants available for planting.

However, there is a general over-dependence of a few selected trees and shrubs. With seven different conifer species to choose from, close to 65 percent of those planted are eastern redcedar. There are 19 broadleaf tree species to choose from and yet green ash and cottonwood comprise 33 percent of these tree types planted. For shrubs, there are 14 species to plant and yet American plum combined with chokecherry account for 26 percent of the shrubs planted.

We encourage as much diversity as possible in the tree and shrub plantings established for conservation uses. The living snow fence planting and the Northeast Arboretum, in general, are designed to show northeast Nebraskans what different plants look like and how they grow. In the living snow fence, every plant available through the Nebraska Conservation Tree/Shrub Program is represented, in addition to other plants that are available from South or North Dakota's Conservation Tree Programs. Hopefully, having this "growing" representation will help the promotion of diversity of adapted and suited trees or shrubs for conservation use.

Swine Research



Manipulating pig growth to enhance producer profitability and consumer acceptance

Michael Brumm

Swine Specialist
Professor, Animal Science

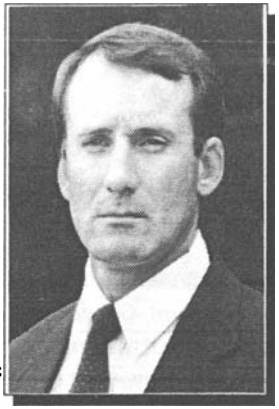
The adoption of sex feeding (feeding barrows and gilts specific diets in separate pens/facilities) has highlighted the growth rate and carcass differences of barrows vs gilts. While barrows generally grow faster than gilts as a consequence of a higher daily feed intake, they are fatter at slaughter.

The difference in growth rate may limit market access for smaller producers with batch (all-in/all-out) production systems in certain markets because they can't put together semi loads of uniform market ready pigs. This is because not enough pigs are market ready at one time to fill a semitrailer (approximately 200 head). In addition, if management and/or dietary methods can be defined that limit the intake of energy (ie feed) during the finishing phase for the barrows, it may be possible to reduce the amount of fat deposited, resulting in a higher price from the packer. Current economics suggest $3-5 per barrow increase in income from marketing semi-load lots direct to packers versus local buying stations and decreasing the carcass fat of barrows.

One method suggested to modify the feed intake of barrows is to reallocate space within a facility. Rather than stocking a grow-finish facility at 7 sq ft for both barrows and gilts, what happens to performance and carcass characteristics when gilts are given 8 sq ft and barrows 6 sq ft (an average of 7 sq ft for all pigs)?

A winter trail with terminal crossbred barrows and gilts and altered space allocations resulted in similar rates of liveweight gain for barrows and gilts. However, the barrows still had a higher daily feed intake than gilts, resulting in a worse feed conversion efficiency and lower percent lean in the carcass at slaughter than gilts.

Beef Research



Animal responses to heat stress and management

Terry Mader

Beef Specialist
Professor, Animal Science

Almost every year, severe heat stress results in cattle losses in major cattle feeding areas. The greatest threat occurs when extended periods of cool weather precede hot and/or hot-humid periods lasting several days or weeks. Cattle that are most affected are those that have recently arrived at the feedlot and fatter animals that are near finish.

As ambient temperature begins to exceed body temperatures, the animal must dissipate body heat through evaporation of water via respiration and/or from the skin by sweating. Under excessive heat load, respiration is responsible for dissipating only a small portion of the heat. Heat loss becomes largely dependent on enhanced blood flow to the skin combined with increased sweating. If limited air flow and/or high humidity limits heat dissipation through evaporation, animal stress and death is imminent if body heat load keeps rising.

Behavioral symptoms that could indicate the development of excessive heat load in feedlot cattle include crowding over water trough; body splashing; agitation and restlessness; refusal to lie down; reduced feed intake; and grouping of animals. With severe heat load, open-mouthed, labored breathing and excessive salivation are clear signs that an animal is failing to cope.

Periods of extreme heat are usually of short duration and have limited impact. However, during periods of extended heat episodes, changes in management practices or facilities to alter the microclimate surrounding the animal

Human Nutrition

Independent Study Course for Child Caregivers

Darlene Martin
Human Nutrition Specialist, Associate Professor, Nutritional Science and Dietetics

A new resource for child caregivers is now available through the University of Nebraska. The ***Independent Study Course for Child Caregivers*** is an alternative way for caregivers to obtain training hours that meet the standards of annual inservice training requirements of the Nebraska Department of Social Services and the Child and Adult Care Food Program.

Caregivers may use the independent study course over a period of three years to obtain training hours. Each of the 11 chapters provides one training hour. Chapter topics include: Nutrition; Food preparation and the USDA meal pattern requirements; Mealtime behavior: The feeding relationship; Food safety; The caregiver; Establishing and maintaining a healthy learning environment; Establishing and maintaining a safe learning environment; How children ages three to five grow and learn; How to select activities that are developmentally appropriate; Children with special needs; and Guidance and discipline.

This was a team project that involved individuals from all three departments within the College of Human Resources and Family Sciences, Extension Educators, Department of Education, Department of Health, Department of Social Services, Early Childhood Training Center, and the Pediatric Gastroenterology and Nutrition Outreach Program.

4-H & Youth

Vickie Greve
Associate Professor, 4-H, Youth Development

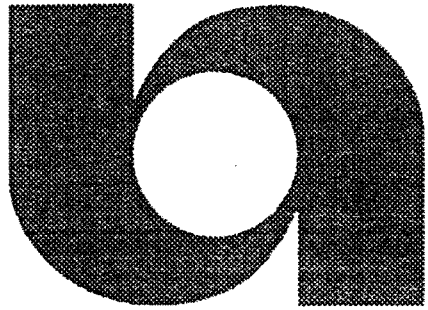
The mission of the Nebraska 4-H program is to assist all youth to reach their fullest potential through utilizing the knowledge base of the Land-Grant University system, learning by doing, and developing life skills.

Extension 4-H and Youth Specialists in Nebraska have the responsibility for designing educational opportunities which actively involve Extension staff, youth, and volunteers in program planning, decision making, and leadership development.

Each specialist works to develop programs in current target areas based on their individual expertise. Currently, Vickie Greve has leadership responsibility for the following areas: volunteer risk management, 4-H Council development, new staff development, volunteerism, and the new 4-H statistical reporting system. She is working with a committee to develop new 4-H leader organizational materials.

She is also a member of a statewide committee who will be introducing "Character Counts" materials to Extension staff throughout Nebraska. This program, aimed at developing character in young people ages 5-18, focuses on the following six pillars of character: trustworthiness, respect, responsibility, fairness, caring, and citizenship. The program uses developmentally appropriate activities to make these abstract concepts more concrete. It will be unveiled in October.

Vickie is also the grant writer for the Omaha Winnebago Indian Reservation After School Program in Thurston County. This program is in its fifth year of programming and has made over 7000 contacts in the first four years.



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NEREC background information

The University of Nebraska is Nebraska's Land Grant University. The Land Grant System was created as a result of the 1862 Morrill Act, which allocated land to each state for the purpose of placing instruction in agriculture and home economics in American higher education. The research component of the Land Grant System was established with the passage of the Federal Hatch Act in 1887. The extension component is the youngest partner in the Land Grant System. It was created in 1912 with passage of the Smith Lever legislation. This unique partnership between teaching, research and extension has proven successful for over 75 years. By combining and blending citizen, academic and governmental inputs, the Land Grant System remains responsive to the specific needs of agriculture as well as the general educational needs of all Nebraskans.

The Northeast Research and Extension Center is one of five Centers administered by the University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources. Center based faculty are dedicated to serving the educational needs of citizens throughout Nebraska. In Concord, we represent the disciplines of Agronomy, Animal Science, Agricultural Economics, Biological Systems Engineering, Entomology, Forestry, Home Economics-Human Nutrition, and 4-H & Youth. All faculty positions carry academic appointments in their respective Departments on the East Campus in Lincoln. In addition to Center faculty, county-based extension educators in the areas of agriculture, home economics, and 4-H and youth are administered from the Center. They represent the three distinct Extension Programming Units of: Northeast Four: Dakota, Thurston, Dixon, and Wayne Counties; Elkhorn Valley: Antelope, Stanton, Madison and Pierce Counties; Eastern Niobrara: Knox, Holt, Cedar, and Boyd Counties; Midland IV: Platte, Colfax, Boone, and Nance Counties.

The Northeast Research and Extension Center had its beginnings during December of 1954 when local citizens formed the Northeast Nebraska Experimental Farm Association. The Association was organized and incorporated in 1955 for the sole purpose of obtaining an experiment station to serve the northeast part of the state. Through the sale of memberships and gifts, nearly $40,000 was raised during that first year. The farm (320 acres) was deeded to the University in 1956 by the C.D. Haskell Family through arrangement of the Association. University and Farm Association funds, and a matching grant from the Haskell Family allowed the present headquarters building to be built and dedicated in 1964. Other Center buildings have been built and upgraded periodically to what you see today. The Center rents an additional 160 acres of land directly south of the farm.

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